The Effects of Oral Rehydration Solutions (Sports Drinks) on Strength, Speed, and Endurance - A Field Study

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The Effect of Oral Rehydration Solutions (Sports Drinks) on Strength, Speed, and Endurance: A Field Study

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Dr. Jon Linderman

INTRODUCTION

• Dehydration has a major impact on cardiovascular performance, at a 2% decline in body mass (4).
• To prevent dehydration, the American College of Sports Medicine recommends a 6% carbohydrate/electrolyte beverage when exercising in a hyperthermic environment (4).
• When comparing carbohydrate sources, combinations of glucose (1) and fructose or glucose and sucrose (2) had higher oxidation.
• We tested CeraSport® which contains rice as its carbohydrate base and a lower concentration level, indicating better absorption rate for an isocaloric amount (3).

METHODS

Subjects, Instrumentation and Measurements
• 13 healthy adult males with a V0.25<80 in the 76th percentile or higher and a body fat index of 15% or lower
• Drinks
  - CeraSport: A rice-based sports drink with carbohydrates and electrolytes
  - Gatorade®: A commercially available sports drink with sucrose and electrolytes
  - Ultima®: A rice-based commercially available sports drink with electrolytes but no carbohydrates
• Protocol
  - Participants weighed, temperature taken, and given a standardized breakfast upon arrival
  - Participants walk 5.25 miles carrying a 40-pound pack
  - After protocol, participants weighed, temperature taken, and a survey completed
  - Every 15 minutes from arrival to departure, participants drank 250ml of their treatment.
• Treatments change each week for a total of three weeks

Measurements Taken

• Maximum and Total Pushups
• Best 40-yard dash time
• Time to complete 5.25 mile walk
• Weight and Temperature change
• Urine output (self-reported) and fluid balance

Statistical Analysis
• One-factor ANOVA in Microsoft Excel with p-value of 0.05
• Averages and Standard Deviations presented

RESULTS

Exercise Between Treatment Groups

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Average Cost (lb)</th>
<th>Average Gain (lb)</th>
<th>Average Weight (lb)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mile Walk (men)</td>
<td>0.08 (±0.47)</td>
<td>0.45 (±0.32)</td>
<td>0.45 (±0.45)</td>
<td>0.67</td>
</tr>
<tr>
<td>1 Mile Run (men)</td>
<td>0.61 (±1.08)</td>
<td>0.67 (±0.96)</td>
<td>0.47 (±1.08)</td>
<td>0.10</td>
</tr>
<tr>
<td>40-yard dash (men)</td>
<td>0.08 (±0.43)</td>
<td>0.28 (±0.36)</td>
<td>0.32 (±0.38)</td>
<td>0.61</td>
</tr>
<tr>
<td>Push-up (total)</td>
<td>120.8 (±35.5)</td>
<td>120.8 (±35.5)</td>
<td>120.8 (±35.5)</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Measurement Between Treatment Groups

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Average Cost (lb)</th>
<th>Average Gain (lb)</th>
<th>Average Weight (lb)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Change Pre to Post</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00</td>
</tr>
<tr>
<td>Weight Change Post to Final</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00</td>
</tr>
<tr>
<td>Percentage Change</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00 (±0.00)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

DISCUSSION

• When compared to similar studies, this project added strength and speed to the endurance component.
• Data was collected en masse as a field study.
• Although potentially more practical, uncontrollable psychological factors of competition between treatment groups may have affected results.
• Although WBGT temperature varied from test day to test day, it never exceeded 77°F.
• The hydration paradigm prevented loss in body mass in all trials but never reached 2% associated with decreased performance.
• Further studies in laboratory using controlled hyperthermic conditions may provide further insights on carbohydrate composition on performance during exercise.

CONCLUSION

The present data suggest that prolonged exercise in a moderate environment has no effect on strength, speed, and endurance, when subjects are well hydrated, and under these conditions the source of carbohydrate in the sports drink does not affect performance.

REFERENCES


ACKNOWLEDGEMENTS

We thank the subjects who volunteered for this study and University of Dayton for providing space and equipment.